

First Mid-term Exam . M203
Summer Semester 39-40H
Time : 90 minute

King Saud University
College of Science
Department of Math.

Mon 28-10-1440H
(1-7-2019 G).

Note: All questions carry equal marks .

Question 1 : Test the convergence or divergence of the sequence $\left\{ \frac{\sin(3n)+3}{n^2+1} \right\}$ and if it converges , find its limit.

Question 2 : Find the sum of the series : $\left[\sum_{n=2}^{\infty} \frac{1}{n^2-1} + \sum_{n=1}^{\infty} \frac{2^n}{5^n} \right]$.

Question 3 : Determine whether the given series $\sum_{n=2}^{\infty} (-1)^n \frac{\sqrt{n}}{n+1}$ is absolutely convergent or conditionally convergent or divergent.

Question 4: Find the interval of convergence and radius of convergence of the power series $\sum_{n=2}^{\infty} (-1)^n \frac{(3x+5)^n}{n \ln n}$.

Question 5: Find the Maclaurin series of e^x and use it to find the Maclaurin series of $\text{Sinh} = \frac{e^x - e^{-x}}{2}$. Further find $\lim_{x \rightarrow 0} \frac{\text{Sinh} x}{x}$.